Abstract:

The present invention provides a double-stranded DNA constructed specially for gene amplification at high speed, a method for gene amplification using the double-stranded DNA and a method to produce proteins.

A system to induce artificial gene amplification at high speed was constructed based on the mechanism of gene replication *in vivo* (BIR). A double-stranded DNA comprising an arrangement of A-B-C and A'-B'-C' or an inverted arrangement of A'-B'-C' was constructed. A and A' are double-stranded DNA capable of undergoing reciprocal homologous recombination and said DNA fragments are arranged each other in an inverted orientation; B and B' are amplifying segments, wherein at least one or the other of said genes contains a target gene for amplification; C and C' are double-stranded DNA capable of undergoing reciprocal homologous recombination, wherein said DNA fragments are arranged each other in an inverted orientation and any DNA sequence could be inserted between C and C'. B and B' may be eliminated and, in this case, A or C could be a target gene for amplification. The double-stranded DNA was integrated into a chromosome or a plasmid and induction of an enzyme to cut an arbitrarily specific sequence induces a break at a specific site, which triggered gene amplification at high speed.